

A NEW SPECIES OF ANTIPATHARIAN  
(CNIDARIA: ANTHOZOA) FROM SEAMOUNTS  
IN THE EASTERN NORTH PACIFIC

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ABSTRACT

*Stichopathes spiessi*, new species, is described from the eastern North Pacific and compared with the closely related *Stichopathes paucispina* (Brook). The two species are differentiated on the basis of the size and shape of the spines (smaller and blunter in *S. spiessi*) and on the size of the polyps (larger and bimodal in *S. paucispina*). *S. paucispina* is redescribed from the type material and its generic placement is established by the uniserial arrangement of its polyps. Both species are found on seamounts in the eastern North Pacific. *S. spiessi* is very abundant at depths of 450–990 m, whereas *S. paucispina* occurs mainly below 1,000 m.

Oceanographic studies have been carried out by Scripps Institution of Oceanography on several seamounts in the eastern North Pacific. Jasper Seamount, located about 550 km southwest of San Diego and rising to within 527 meters of the ocean's surface, has been the main focus of these studies. Fieberling Guyot (top at a depth of 440 m), located northwest of Jasper and Opal Seamount (top at 1002 m depth), located east of Jasper, have also been surveyed. These studies have revealed several distinct deep-sea rocky bottom communities including one on the upper slopes of the seamounts that is dominated by unbranched antipatharian corals of the genus *Stichopathes* (Fig. 1; Genin et al. 1986). Samples of these black corals were collected from several of the seamounts and deposited in the collections of the U.S. National Museum. After examination by light and scanning electron microscopy and comparison with type material from the British Museum, it was concluded that the specimens included two species, one previously described as *Stichopathes paucispina* (Brook), and one new species which is here given the name *Stichopathes spiessi*.

Order ANTIPATHARIA  
Family ANTIPATHIDAE  
Genus *Stichopathes* Brook, 1889  
*Stichopathes spiessi* new species  
Figures 1–3, Table 1

*Holotype*.—USNM 82983, eastern North Pacific, Jasper Seamount, 30°25'N, 122°45'W, ~900 m, Scripps Institution of Oceanography, MAG-I Expedition, R/V NEW HORIZON, 18 September 1984.

*Paratypes*.—USNM 82984, Jasper Seamount, 30°26.6'N, 122°43.6'W to 30°26.5'N, 122°43.8'W, 900–750 m, SEATOMADO Expedition, R/V T. WASHINGTON, 1 November 1986, 1 specimen. USNM 82985, Jasper Seamount, 30°25.6'N, 122°43.7'W to 30°25.5'N, 122°44.3'W, 950–840 m, SEATOMADO Expedition, R/V T. WASHINGTON, 1 November 1986, 1 specimen. USNM 82986, Jasper Seamount, 30°25'N, 122°45'W, depth not reported, CRATERS Expedition, R/V ATLANTIS II, 20 October 1984, 1 specimen. USNM 82987, Fieberling Seamount, 32°25.78'N, 127°47.4'W, 440–488 m, PPTU-II Expedition, R/V T. WASHINGTON, 18 August 1986, 3 specimens.

*Description*.—Colony unbranched, 1.5 m or more in height, rising vertically a variable distance from basal plate, then curving horizontally in very loose and irregular spirals (Fig. 1). Diameter of axis just above basal plate about 2 to 2.5 mm in large colonies. Spines (Fig. 2) conical in appearance, laterally compressed, blunt, with small tubercles or knobs at apex and extending down the sides, usually

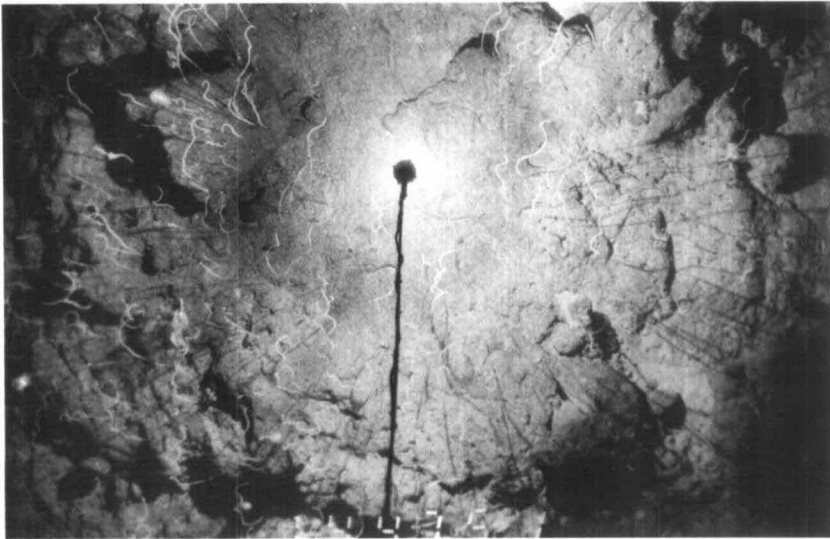


Figure 1. In situ photograph of colonies of *Stichopathes spiessi* at 630 m depth on Jasper Seamount, eastern North Pacific.

$\frac{1}{4}$  to  $\frac{1}{3}$  (Fig. 2C–F), but up to  $\frac{2}{3}$  distance to base (Fig. 2G–H). Spines 0.14 to 0.24 mm long (mostly  $\leq 0.2$  mm) as measured from apex of spine through center to base; equal in size or slightly smaller on opposite (abpolypar) side of axis. Distal edge of spines generally straight (Fig. 2F) or slightly concave (Fig. 2E), curved near base and extending onto axial surface as a short sloping ridge. Distal edge angle of spines (angle of projection of distal edge relative to axial surface) varying from slightly obtuse (Fig. 2C–D) to slightly acute (Fig. 2E, G). Proximal edge of spines strongly inclined distally (Fig. 2C–H) and extending basally onto axial surface as a sloping ridge slightly longer than that on distal edge. Spines arranged in 7 to 10 longitudinal rows (most commonly in 8–9 rows) with 5 to 6 rows of complete spines visible from one view (Fig. 2A–B), and spaced 0.5–1.4 mm apart (distance from apex of adjoining spines in one row). Spines in adjacent rows regularly offset from one another such that a helical or spiral pattern is evident (Fig. 2A–B). Polyps 1.2 to 1.8 mm in diameter along transverse axis (from proximal side of proximal lateral tentacles to distal side of distal lateral tentacles) and arranged in a single straight row (Fig. 3A–B). Interpolypar space (distance between adjacent polyps) 0.4 to 1.3 mm. Three to five polyps along one centimeter of axis. Proximal lateral and sagittal tentacles about equal in length, usually 2.1 to 2.6 mm long, but up to 3.2 mm; distal lateral tentacles relatively short, mostly 1.4 to 1.5 mm long, but up to 1.75 mm in some polyps.

**Remarks.**—The specimens examined exhibit a level of variability in morphological characters that is typical of antipatharians in general. Morphometric data for the principal taxonomic features of the spines and polyps are given in Table 1. Substantial variability in the size and density of the spines occurs within a single specimen as well as between different specimens. Similar levels of variability occur in the extent of development of the tubercles on the surface of the spines. Most frequently the tubercles occur as small conical elevations with a relatively sharp apex (Fig. 2C, E–H); however, they can also be more blunt and knob-like (Fig. 2D). In most of the specimens examined the tubercles are confined to the tip and

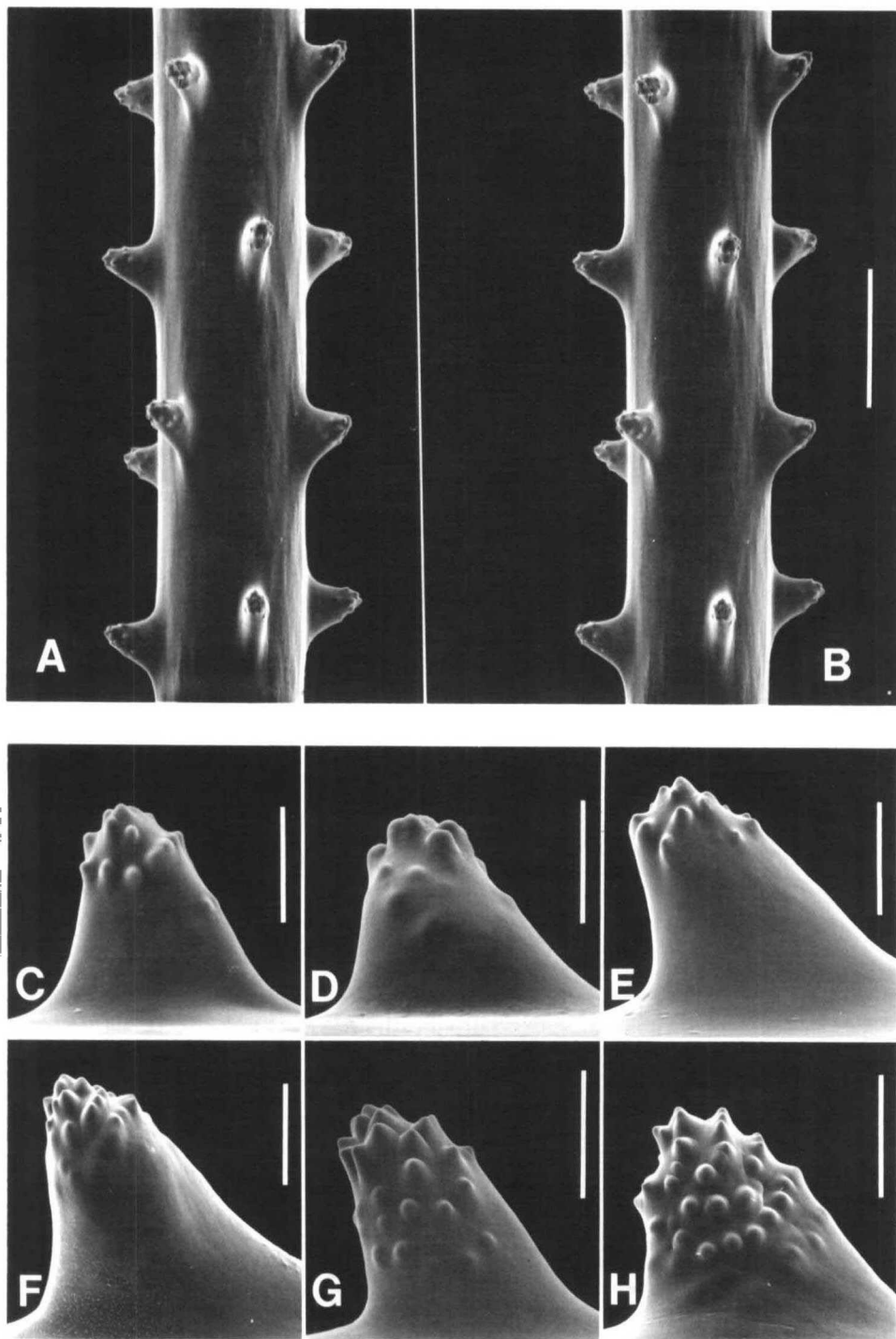


Figure 2. *Stichopathes spiessi*, scanning electron micrographs: A and B, stereo pair, axis of holotype (USNM 82983); C and D, spines of holotype (USNM 82983); E, spine of paratype (USNM 82986); F, spine of paratype (USNM 82987); G, spine of paratype (USNM 82985); H, spine of paratype (USNM 82984). Bar = 0.5 mm in A/B, 0.1 mm in C-H.

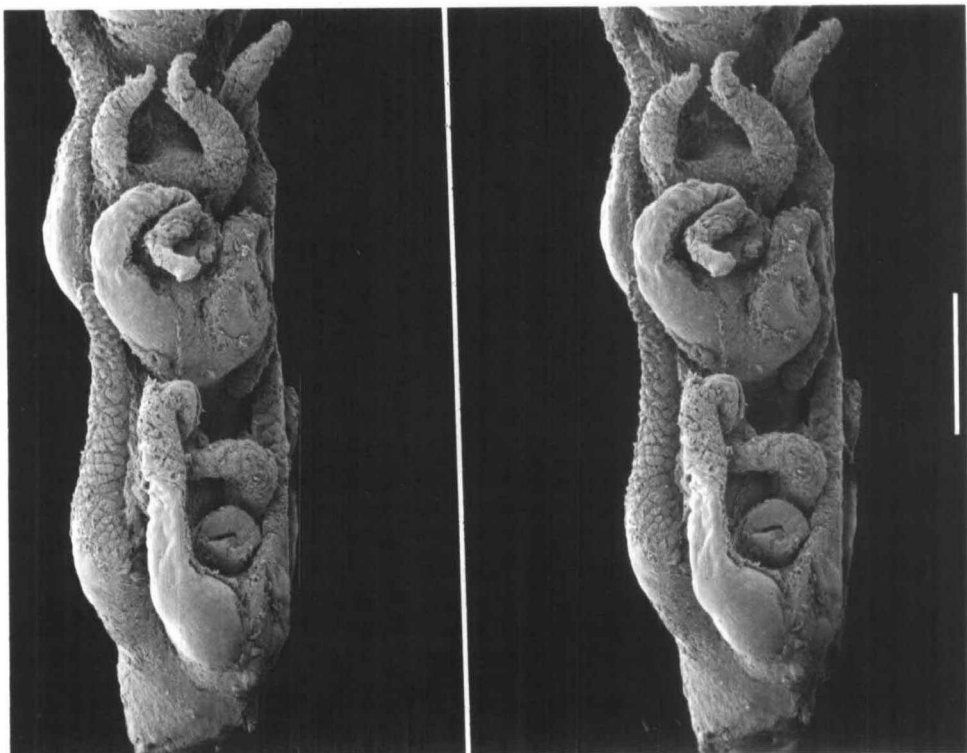


Figure 3. *Stichopathes spiessi*, scanning electron micrographs: stereo pair—polyps of paratype (USNM 82986). Bar = 1 mm.

upper  $\frac{1}{3}$  of the surface of the spines, but in some specimens they are more numerous and extend down the sides of the spines about  $\frac{2}{3}$  the distance to the base (Fig. 2G–H). Other variations in the morphology of the spines include infrequent occurrences of spines with a flattened apex, or of spines with a swollen cap-like apex. In addition, in a few specimens there are occasional instances of bifid or double spines on the lower (older) parts of the corallum.

Variability in polyp size is reflected in the fact that there can be as few as three and as many as five polyps occurring along 1 cm of axis; however, in most cases there are usually 4–5 per centimeter.

The color of the polyps, as was seen when the type specimen was brought aboard the ship, is pink.

*Systematic Relationships.*—*Stichopathes spiessi* resembles *Stichopathes paucispina* (Brook) in that both species have relatively small and widely spaced spines with small tubercles near the apex. Reexamination of the type of *S. paucispina* (see below) and comparison with another recently collected specimen of *S. paucispina*, show that distinct differences exist between *S. paucispina* and *S. spiessi* in the size and morphology of the spines and polyps (Table 1). The major distinguishing features are the shorter, blunter spines and uniform polyp size in *S. spiessi*, compared with the longer, more acute spines and bimodal polyp size in *S. paucispina*. In *S. spiessi* the spines are generally not more than 0.20 mm in length whereas in *S. paucispina* they can reach 0.34 mm. The differences in the bluntness of the spines can be seen by comparing Figures 2C–H and 4C–D. All

Table 1. Counts and measurements for *Stichopathes spiessi*, n. sp. and *Stichopathes paucispina* (Brook)

Specimen (Loc.)	Spines			Total number of rows	Polyps		
	Length (mm)	Distance apart (mm)	Number of rows 1 aspect		Polyp size (mm)	Interpolyp space (mm)	Number of polyps per cm
<i>S. spiessi</i>							
USNM 82983 (Jasper) <sup>a</sup>	0.14-0.2	0.5-1.3	5	9	1.5-1.8	0.4-0.65	4-5
USNM 82985 (Jasper)	0.16-0.23	0.6-1.1	5-6	9-10	1.6-1.8	0.75-1.3	3-4.2
USNM 82986 (Jasper)	0.16-0.2	0.9-1.4	5-6	7-8	1.6-1.8	0.6-0.7	4-5
USNM 82986 (Jasper)	0.18-0.22	1.0-1.25	5-6	8	1.6-1.95	0.6-0.85	3.5-5
USNM 82986 (Jasper)	0.18-0.25	0.85-1.2	5-6	8	1.2-1.45	0.4-0.6	4.5-5
USNM 82987 (Fieberling)	0.18-0.22	0.6-1.2	5-6	9	1.6-1.8	0.5-0.6	4-5
USNM 82987 (Fieberling)	0.2-0.24	1.1-1.4	6	9-10	—	—	3-5
USNM 82984 (Jasper)	0.14-0.2	0.85-1.3	5-6	9-10	1.4-1.8	0.5-0.6	4
<i>S. paucispina</i>							
Type <sup>b</sup>	0.28-0.34	0.86-1.14	5	7	2.4-3.4	—	2.5
USNM 82988 (Opal)	0.28-0.32 <sup>c</sup>	0.7-1.0	5-6	8-9	2.3-2.8 <sup>e</sup>	0.8-1.8	3
	0.18-0.24 <sup>d</sup>				0.8-1.2 <sup>f</sup>	0.4-0.7	

<sup>a</sup> Holotype; all other specimens are paratypes.<sup>b</sup> British Museum Reg. No. 1873.4.26.1.<sup>c</sup> Polypar spines.<sup>d</sup> Abpolypar spines.<sup>e</sup> Large polyps.<sup>f</sup> Small polyps.

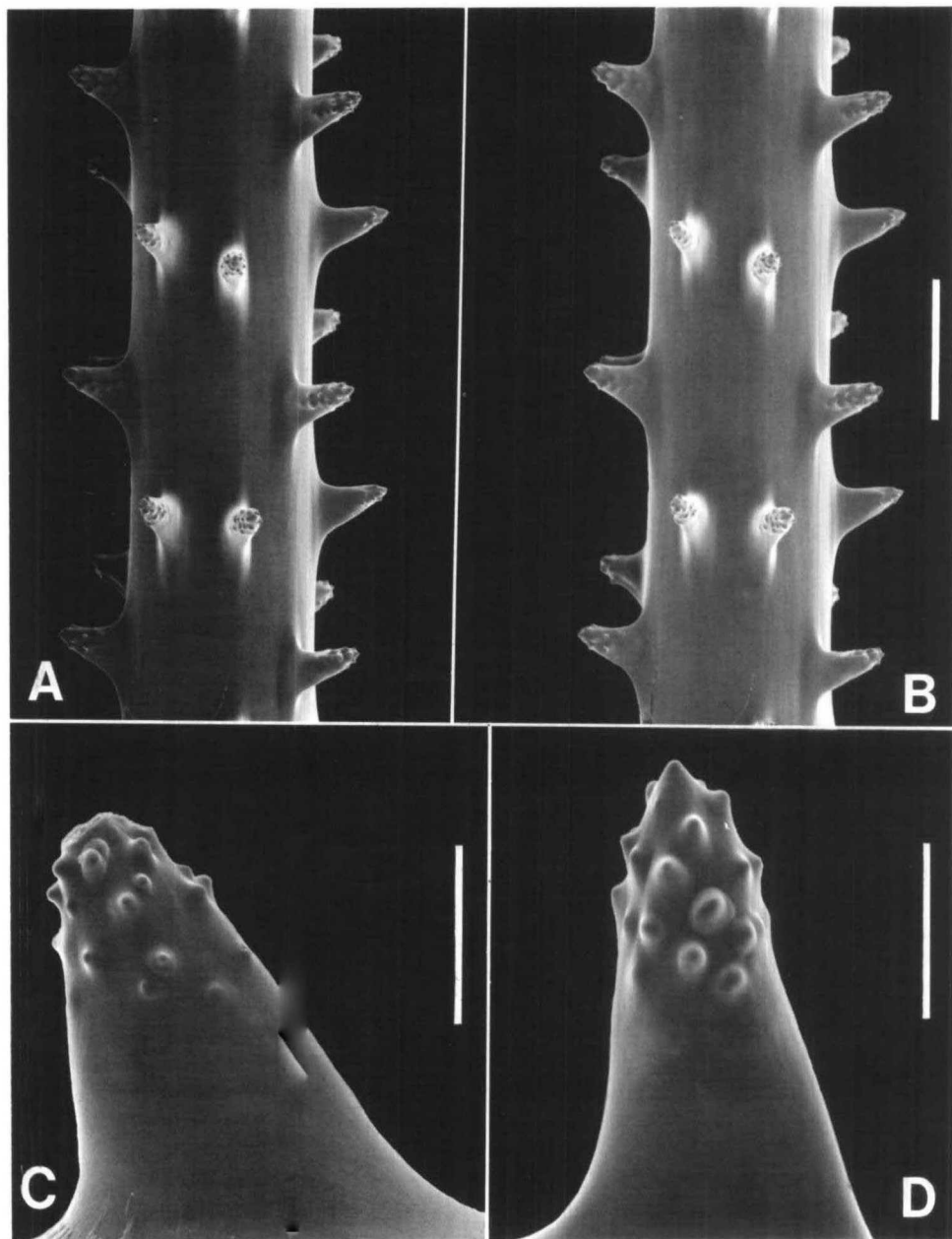


Figure 4. *Stichopathes paucispina*, scanning electron micrographs: A and B, stereo pair—axis of specimen from Opal Seamount, (USNM 82988); C, spine of holotype, British Museum 1873.4.26.1; D, spine of specimen from Opal Seamount (USNM 82988). Bar = 0.5 mm in A/B, 0.1 mm in C–D.

the polyps in a colony of *S. spiessi* are similar in size and usually less than 2 mm in transverse diameter. In contrast, the polyps in a colony of *S. paucispina*, occur in two size groups, 0.8–1.2 mm and 2.3–3.4 mm, and on parts of some colonies the large and small polyps are arranged in an alternating pattern. The arrangement can also be quite irregular, but two small polyps normally do not occur side by side. In general appearance the polyps of the two species are similar in that the

distal lateral tentacles are only about half the size of the sagittals or proximal laterals; however, in *S. spiessi* the sagittal and proximal lateral tentacles are nearly equal in size while in *S. paucispina* the sagittals are often slightly longer than the proximal laterals.

The two species also differ in the relative development of the polypar and abpolypar spines and in the formation of bifid or double spines on the older portions of the colony. In *S. paucispina* the polypar spines can be up to twice as long as the abpolypar spines; in comparison, the spines of *S. spiessi* are usually equal in length on all sides of the axis, or at most only slightly longer (about 10%) on the polypar side. Forked spines, and double and occasionally triple spines are commonly seen on the older parts of the corallum in *S. paucispina* (this was seen in the specimen collected from Opal Seamount, but could not be verified in the type, which consists only of the upper portion of the colony).

*Etymology.*—This species is named in honor of Dr. Fred Noel Spiess of Scripps Institution of Oceanography for his important contributions to our knowledge of the deep oceans and for his continuous encouragement and support of work on seamount ecology. Dr. Spiess was the Chief Scientist on the expedition on which the holotype was collected.

*Distribution.*—*S. spiessi* has been collected and observed on Fieberling Guyot and Jasper Seamount in the eastern North Pacific. Photographs taken on the nearby Westfall Seamount (off northern Mexico) show specimens that appear to be *S. spiessi*. The species occurs at depths from 440 m (the peak of Fieberling Guyot) to 1,110 m, with the highest densities found between depths of 450 and 900 m.

*Ecological Notes.*—The ecology of *S. spiessi* on Jasper Seamount and Fieberling Guyot has been studied using deep-sea photographs (Genin et al. 1986; Genin 1987; Genin and Dayton, in prep.<sup>1</sup>). The species is confined to hard bottom areas. The colony is attached to the rocky bottom with its discoid basal plate. The lower portion of the colony (about a third or more) rises vertically from the bottom without spiraling, whereas the upper portion is usually coiled and bent horizontally down-stream. Neighboring colonies apparently do not touch one another. On both seamounts, *S. spiessi* is the dominant megafaunal species on the rocky bottom between 450 and 900 m, with densities reaching 15 colonies per square meter. Densities of *S. spiessi* are higher near topographic peaks and on prominent features than at mid-slope sites and on flat areas, respectively. Physical studies (Genin et al. 1986; Genin 1987) suggest that the sites of high *S. spiessi* abundance are characterized by exposure to strong currents and low sediment cover. All the colonies examined, comprising specimens collected in August, September, October, and November contained eggs of variable sizes.

### *Stichopathes paucispina* (Brook)

Figures 4 and 5, Table 1

*Cirripathes? paucispina* Brook 1889:86, pl. 12, fig. 6; not van Pesch 1910:39 and 1914:174–175.

*Material Examined.*—Holotype, British Museum Reg. No. 1873.4.26.1, locality unknown, presented to the British Museum by Gassiot, 2 fragments. USNM 82988, eastern North Pacific, Opal Seamount, 30°30'N, 121°54.8'W, 1,350 m, CRATERS Expedition, R/V ATLANTIS II, 23 October 1984, 1 specimen.

*Description.*—Colony unbranched, 1.5 m or more in length, generally rising vertically in loose irregular spirals. Spines conical, somewhat compressed, with a

<sup>1</sup> Genin, A. and P. K. Dayton. 1986. Patterns of distribution on Rocky bottom in the deep sea. In preparation.

moderately sharp apex, and covered with small tubercles at the apex and down the sides to about  $\frac{2}{3}$  the distance to base (Figs. 4 and 5). Polypar spines up to 0.34 mm long; abpolypar spines up to 0.24 mm long (as measured from apex of spine through center to base), abpolypar spines about 60% the length of polypar spines. Distal edge of spines straight, slightly inclined distally (Fig. 4C), or extending out nearly perpendicularly to the axial surface (Fig. 4D). Proximal edge of spines inclined distally. Both distal and proximal edge of spines extending onto general axial surface as a short sloping ridge. Spines arranged in 7 to 9 longitudinal rows with 5 to 6 (rarely 4) rows of complete spines visible from one view (Fig. 4A–B), spaced 0.7–1.14 mm apart (distance from apex of adjoining spines in one row). Spines in adjacent rows irregularly offset from one another so that a spiral pattern is not apparent, however, on some parts of corallum, spines from every other row at or near the same level, thereby forming rings of spines around the circumference of the axis. Spines on older, thicker parts of axis becoming bifurcated, rarely trifurcated, and developing into double or triple spines (Fig. 5C–D).

Polyps of two sizes, arranged in a single, straight row, with small polyps either alternating regularly with large polyps, or occurring irregularly, but never with two small polyps side by side. Large polyps (Fig. 5B) generally 2.3 to 3.4 mm in transverse diameter (from proximal side of proximal lateral tentacles to distal side of distal lateral tentacles); interpolypar space (distance between adjacent polyps) 0.8 to 1.8 mm. Small polyps 0.8 to 1.2 mm in transverse diameter and separated from large polyps by interpolypar space of 0.4 to 0.7 mm. Usually 2.5 to 3 polyps occurring along one centimeter of axis. Sagittal tentacles up to 4 mm long in large polyps, usually slightly longer than proximal lateral tentacles; distal lateral tentacles relatively short, but up to 2 mm in the largest polyps.

*Remarks.* — Reexamination of the type specimen has verified several of the original observations made by Brook (1889) and it has also brought to light new information by which the species can be distinguished. As noted by Brook, the spines are relatively short, distant, slightly rugose and not arranged in a well marked spiral pattern; however, reexamination of the type has shown that the spines are longer than those illustrated by Brook. This discrepancy might be due to Brook's not seeing the longer polypar spines. The spines on the type are also not as blunt as suggested by Brook's illustration.

Brook reported that the polyps of this species were unknown; however, five dried polyps, three large ones and two small ones, were found on the type specimen. These are arranged uniserially with the large polyps alternately with the small ones. One of the large polyps is shown in Figure 5B.

Although only one other specimen of this species was available for examination, it provides substantial confirmation of the characters seen in the type. The spines and polyps are similar in size to those of the type, and in both cases they are larger than those in *S. spiessi* (Table 1). As in the type, the specimen from Opal Seamount shows, at least on some parts of the colony, the same pattern of alternating polyp size.

The specimen from Opal Seamount also shows that many of the spines on the older, more basal part of the corallum become bifurcated or trifurcated and eventually develop into double and triple spines. This character is not noticeable in the type specimen probably because the type is only a small fragment from the younger, upper part of a colony.

*Systematic Relationships.* — Brook (1889) questionably referred this species to the genus *Cirrihipathes*. As described above, the polyps follow the uniserial arrangement that is typical of *Stichopathes*, as the genus was originally established by



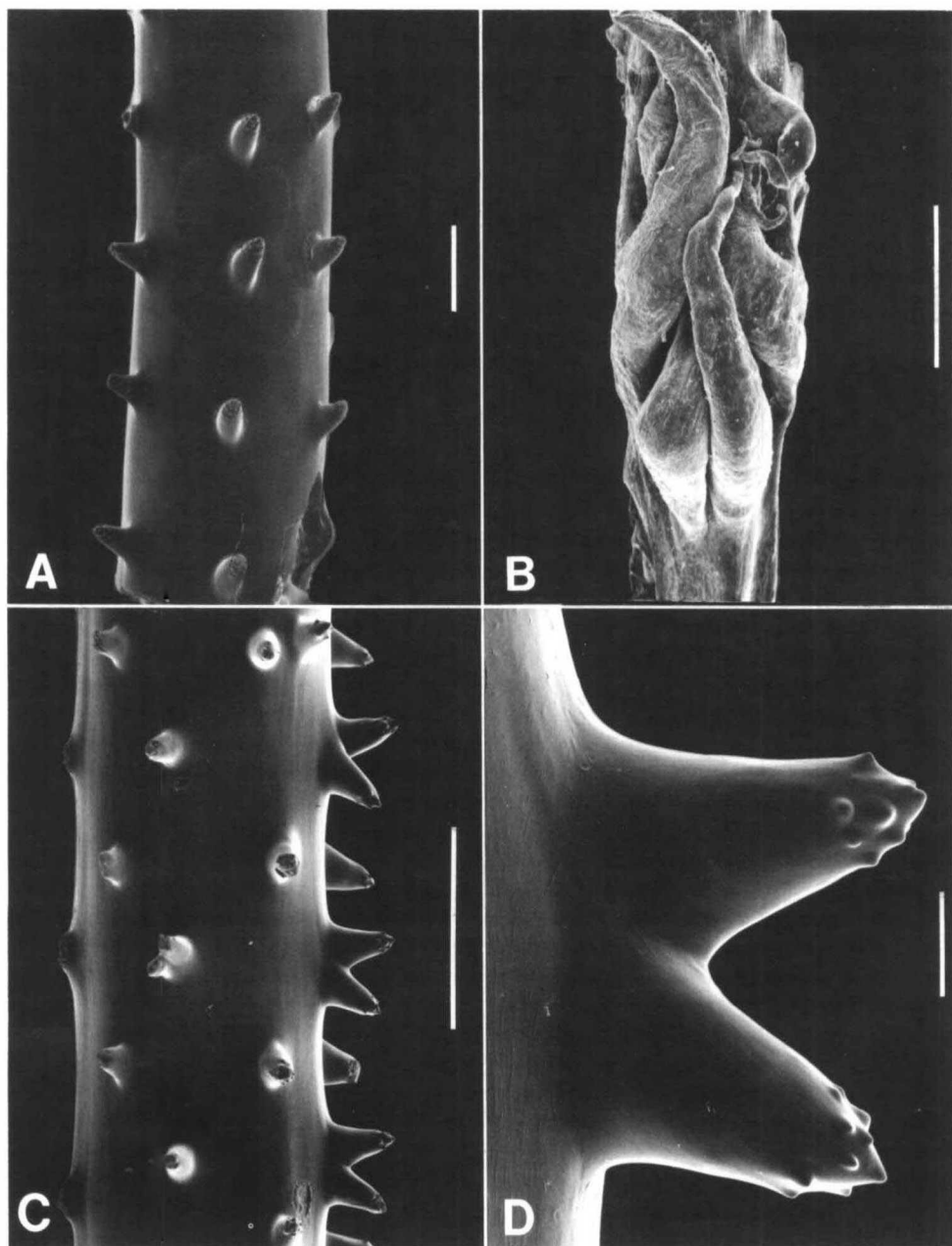


Figure 5. *Stichopathes paucispina*, scanning electron micrographs: A, axis of holotype, British Museum 1873.4.26.1; B, polyp of holotype; C, lower part of axis of specimen from Opal Seamount (USNM 82988); D, double spine of specimen from Opal Seamount. Bar = 0.5 mm in A, 1 mm in B–C, 0.1 mm in D.

Brook (1889). Although the generic distinctions between *Stichopathes* and *Cirripathes* have been questioned by van Pesch (1914), other workers such as Pax (1918) and Pasternak (1977) have argued for retaining them as separate genera. It is the latter position that is followed here.

The specimens identified as *S. paucispina* by van Pesch (1910; 1914) differ in several points from the type; they have much smaller spines (0.15 mm polypar and 0.09 mm abpolypar), which occur in a much greater number of longitudinal rows (10 seen in one aspect), and are spaced much closer together (0.45 mm apart in one row). Polyps were not present on van Pesch's specimens.

*Ecological Notes.*—As in the case of *S. spiessi*, this species is found on rocky bottom on seamounts of the eastern North Pacific; however, it occurs at greater depths than *S. spiessi*, generally below about 1,000 m. Its density at these greater depths is very low, much less than 1 colony per square meter. The species was collected from Opal Seamount and identified in photographs taken at Jasper and Flint seamounts. Since no photographs are available from great depths on Fieberling Guyot, it is not known whether the species occurs on the lower flanks of this seamount. The specimen collected from Opal Seamount in October 1984 contained eggs.

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